Trend Study 24-7-97

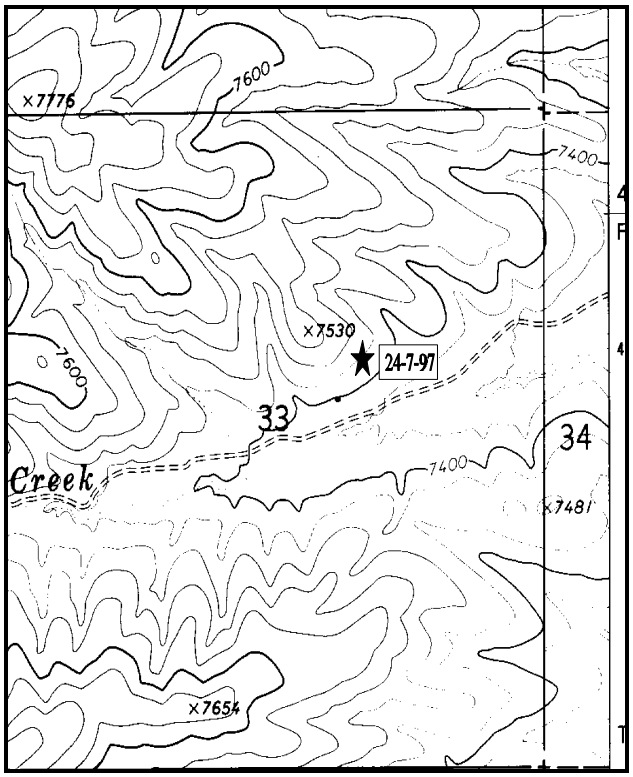
Study site name: Cow Creek . Range type: Chained, Railed-Shrubland .

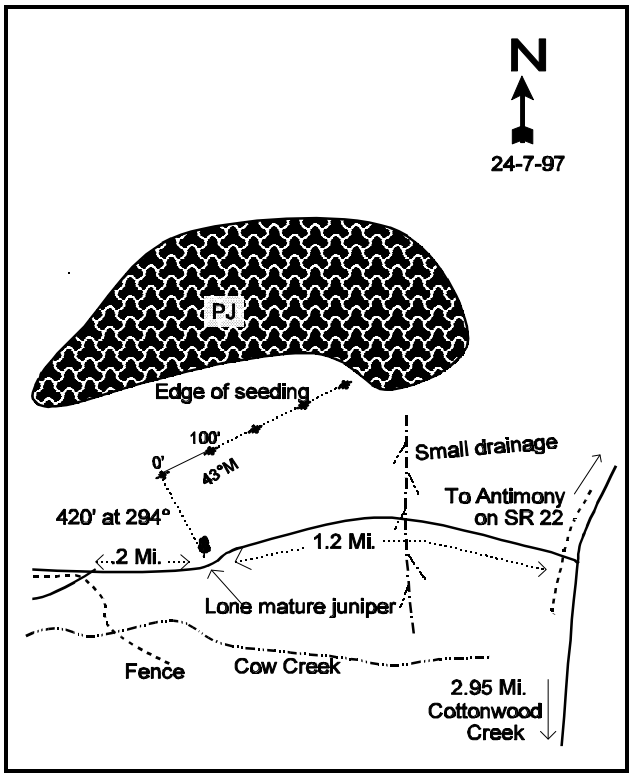
Compass bearing: frequency baseline 43 degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the Cottonwood Creek turnoff on SR22 south of Antimony, proceed north on the highway 2.95 miles to a gate by Cow Creek. Turn west and drive through the seeded pasture up Cow Creek for 1.2 miles to a lone mature juniper right by the road. If you go too far (0.2 more miles) you will come to a fork by a fence. Stop by the lone Juniper and walk up the hill about 140 yards bearing 294 degrees to the start of the baseline a short fencepost with browse tag #9002. The transect runs east-northeast along the top edge of the seeding.





Map Name: Cow Creek Diagrammatic Sketch

Township 32S , Range 2W , Section 33 UTM 4203923.054 N, 411418.356 E

DISCUSSION

Trend Study 24-7 (50-7)

The Cow Creek study site is located on School Trust land in the mouth of Cow Creek at an elevation of 7,500 feet. This is a sagebrush-grass site that was disked and drill seeded prior to study establishment in 1987. It is a key area for elk in the spring and also for deer during the winter and spring. Antelope probably use this area year-round. Pellet group data from 1997 estimate seven deer, 63 elk and 27 cow use days/acre. Sheep sign was also noted in 1997. Wyoming big sagebrush occurs on the foothill slopes and basin big sagebrush is found on the deeper soils of the drainage bottoms. The treatment was more effective on the Wyoming big sagebrush than the Basin big sagebrush. The Basin big sagebrush that was not killed has regrown with vigorous vegetative growth and seed stalk production. The site is located on a 20-25% slope that has a southeast exposure.

The soil at the study site is moderately deep and rocky with an estimated effective rooting depth (see methods) of almost 18 inches. Texture is a sandy loam with a slightly alkaline pH (7.4). Erosion pavement is present on the surface, as are rocks of various sizes. Litter from the disked sagebrush and the drill rows of seeded grasses serve to slow down water movement. However, the higher incidence of pedestalled bunch grasses and small rills indicates that a significant amount of soil movement has taken place in the area. The soil is very loose and easily transported during high intensity summer storms. Although the seeding greatly increased the grass cover, patches of bare ground are prevalent between the drill rows.

The key shrub species on this site is Wyoming big sagebrush. Basin big sagebrush was supposedly encountered in 1987, but the crew in 1991 classified all the sagebrush as Wyoming big sagebrush. There is some hybridizing of the two species making identification difficult. Density was estimated at 3,466 plants/acre in 1987 and 3,199 by 1991. Density had declined by 29% in 1997, due to a die-off of decadent plants which accounted for 60% of the population in 1991. Of the sagebrush sampled in 1987, 94% percent were mature or decadent, and therefore, were established prior to the treatment. Currently, 92% of the population is mature or decadent. Utilization of the sagebrush has been moderate to heavy in 1987 and 1991, but light to moderate in 1997. There was a relatively large die-off of decadent plants in 1991. The die-off will continue, but not at as high a rate. The pattern of the die off is shown in the percentage of decadent plants that were classified as dying. Since 1987, this percentage has increased steadily from 12% in 1987, to 48% in 1991, and finally 56% in 1997. Vigor has improved and percent decadence has declined, however there is very little biotic potential or young plants in the population to replace the losses to the population. Therefore, the trend would continue to be slightly down.

Broom snakeweed is the second most abundant shrub, but it has declined steadily in density from 4,133 plants/acre in 1987 to only 220 in 1997. It currently provides less than 1% of the browse cover. Pinyon and juniper trees are found scattered throughout the site at densities estimated at 14 trees/acre for juniper and 42 trees/acre for pinyon in 1997. Overhead canopy cover of pinyon is currently estimated at 5%.

The herbaceous understory on the site is dominated by grasses, the most abundant of which is crested wheatgrass (seeded) and a warm season native, blue grama. Intermediate wheatgrass (also seeded) is less abundant and has declined in quadrat frequency from 34% in 1987 to only 4% in 1997. This site is probably marginal for intermediate wheatgrass since it is east of Mt. Dutton and within a rain shadow. Forbs are very limited with six species producing only 1% cover. Rangeland alfalfa was seeded on the site but it has not done well. It had a quadrat frequency of only 3% in 1987 and was not encountered in 1991 or 1997. The only common forbs include Newberry milkvetch and a cryptantha.

1991 TREND ASSESSMENT

Both vegetative basal and litter cover have been reduced dramatically since 1987. Bare ground, pavement, and rock cover have all increased. These respective increases and decreases indicate a downward trend for soil. Population density for the key browse species, Wyoming big sagebrush, has gone from 3,466 to 3,199 plants per acre, an 8% drop. Broom snakeweed has decreased by 36%. Even with the great decrease in broom snakeweed, the trend would still be slightly downward with the increase in the rate of decadency for Wyoming big sagebrush reaching 60%. Plants displaying poor vigor has also increased from 6% to 33%. Trend for the herbaceous understory is down slightly due to a significant decline in the sum of nested frequency of the seeded crested and intermediate wheatgrass. Nested frequency of blue grama increased significantly but this is a less desirable and less productive grass.

TREND ASSESSMENT
soil - slightly downward
browse - slightly downward
herbaceous understory - slightly downward

1997 TREND ASSESSMENT

Trend for soil is stable with similar ground cover characteristics compared to 1991. Trend for the key browse species, Wyoming big sagebrush, is slightly down. Density has declined by 29% due to a die-off of decadent plants. However, density of mature plants increased slightly. Use is more light to moderate, vigor improved and percent decadence has declined from 60% to 34%. However, the percentage of decadent plants classified as dying has steadily increased since 1987, indicating further losses in the population. Recruitment is improved with increased numbers of seedling and young plants, but they are still inadequate to replace those that have died. A positive trend indicator is the 92% decline in the density of broom snakeweed which now numbers only 220 plants/acre. Trend for the herbaceous understory is stable but forbs are still very limited.

TREND ASSESSMENT
soil - stable
browse - slightly down
herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 24 , Study no: 7

Type	Species	Nested Frequency '87	'91	'97	Quadrat Frequency '87	'91	'97	Average Cover % '97
G	Agropyron cristatum	$_{b}$207	$_{a}$169	$_{ab}$193	70	65	67	6.09
G	Agropyron intermedium	$_{b}$65	$_{a}$5	$_{a}$9	34	2	4	.04
G	Bouteloua gracilis	$_{a}$90	$_{a}$113	$_{b}$151	35	40	55	4.38
G	Bromus inermis	5	-	-	3	-	-	-
G	Dactylis glomerata	2	9	-	1	3	-	-
G	Oryzopsis hymenoides	2	9	6	2	5	3	.07
G	Poa secunda	-	-	2	-	-	1	.00
G	Sitanion hystrix	$_{b}$119	$_{b}$137	$_{a}$51	55	59	24	.68

Type	Species	Nested Frequency '87	'91	'97	Quadrat Frequency '87	'91	'97	Average Cover % '97
G	Stipa comata	12	11	20	5	6	8	.19
Total for Grasses		502	453	432	205	180	162	11.48
F	Astragalus newberryi	22	22	27	9	12	13	.06
F	Chenopodium spp. (a)	-	-	3	-	-	1	.00
F	Cryptantha spp.	$_{a}$17	$_{ab}$31	$_{b}$39	8	16	20	.59
F	Gayophytum ramosissimum (a)	-	-	21	-	-	8	.26
F	Medicago sativa	4	-	-	3	-	-	-
F	Sphaeralcea coccinea	-	-	6	-	-	3	.01
F	Streptanthus cordatus	-	-	2	-	-	2	.03
Total for Forbs		43	53	98	20	28	47	0.97

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 24 , Study no: 7

Type	Species	Strip Frequency '97	Average Cover % '97
B	Artemisia tridentata wyomingensis	64	6.56
B	Gutierrezia sarothrae	8	.04
B	Juniperus osteosperma	1	-
B	Opuntia spp.	2	.03
B	Pinus edulis	3	6.07
Total for Browse		78	12.72

CANOPY COVER --
Herd unit 24 , Study no: 7

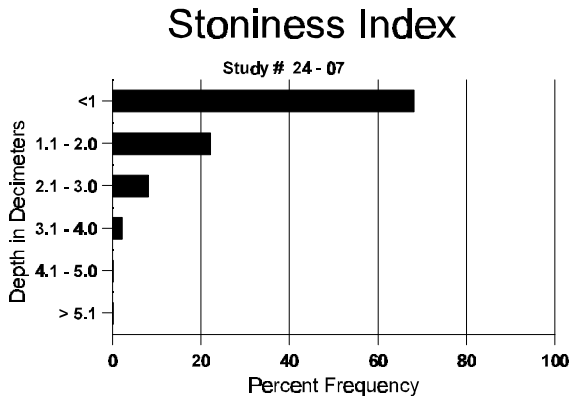
Species	Percent Cover '97
Pinus edulis	5

BASIC COVER --
Herd unit 24 , Study no: 7

Cover Type	Nested Frequency '97	Average Cover % '87	'91	'97
Vegetation	306	10.00	7.25	26.76
Rock	218	4.25	6.25	3.86
Pavement	353	20.25	35.25	27.72
Litter	385	57.00	39.75	33.72
Cryptogams	-	0	0	0
Bare Ground	271	8.50	11.50	9.88

SOIL ANALYSIS DATA --
Herd Unit 24, Study no: 07

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
17.8	56.2 (16.6)	7.4	65.0	20.1	14.9	2.7	19.1	54.4	.5



PELLET GROUP FREQUENCY --
Herd unit 24 , Study no: 7

Type	Quadrat Frequency '97
Rabbit	13
Elk	31
Deer	17
Cattle	4

BROWSE CHARACTERISTICS --
Herd unit 24 , Study no: 7

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	87	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	87	2	1	-	-	-	-	-	-	-	3	-	-	-	200			3
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	97	9	-	-	-	-	-	-	-	-	9	-	-	-	180			9
M	87	19	4	9	-	-	-	-	-	-	29	3	-	-	2133	16	17	32
	91	7	8	2	-	1	-	-	-	-	17	-	1	-	1200	13	16	18
	97	49	16	1	-	-	-	-	-	-	64	2	-	-	1320	21	27	66
D	87	8	3	6	-	-	-	-	-	-	12	2	1	2	1133			17
	91	9	11	8	1	-	-	-	-	-	14	-	1	14	1933			29
	97	21	14	2	-	2	-	-	-	-	17	-	-	22	780			39
X	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	1100			55

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	15%	29%	06%	- 8%
'91	42%	21%	33%	-29%
'97	28%	03%	19%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	3466	Dec:	33%
	'91	3199		60%
	'97	2280		34%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	87	17	-	-	-	-	-	-	-	-	17	-	-	-	1133			17
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	87	14	-	-	-	-	-	-	-	-	14	-	-	-	933			14
	91	4	1	-	-	-	-	-	-	-	5	-	-	-	333			5
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	87	48	-	-	-	-	-	-	-	-	48	-	-	-	3200	8	6	48
	91	23	1	-	-	-	-	1	-	-	22	3	-	-	1666	5	6	25
	97	8	-	-	1	-	-	-	-	-	9	-	-	-	200	8	8	10
D	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	9	1	-	-	-	-	-	-	-	7	-	-	3	666			10
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	-36%
'91	08%	00%	08%	-92%
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	4133	Dec:	0%
	'91	2665		25%
	'97	220		0%

Juniperus osteosperma																		
Y	87	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	1	-	-	-	-	-	-	-	-	-	1	-	-	66			1
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	+ 0%
'91	00%	00%	00%	-70%
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	66	Dec:	-
	'91	66		-
	'97	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
Y	87	7	-	-	-	-	-	-	-	-	7	-	-	-	466			7
	91	1	1	-	-	-	-	-	-	-	2	-	-	-	133			2
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	87	1	-	-	-	-	-	-	-	-	1	-	-	-	66	4	7	1
	91	4	-	-	-	-	-	-	-	-	4	-	-	-	266	3	5	4
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40	5	10	2
D	87	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	-40%
'91	17%	00%	00%	-90%
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	665	Dec:	20%
	'91	399		0%
	'97	40		0%

Pinus edulis																		
Y	87	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	1	-	-	-	-	-	1	-	-	2	-	-	-	40	-	-	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	+ 0%
'91	00%	00%	00%	- 9%
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	66	Dec:	-
	'91	66		-
	'97	60		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Sclerocactus																		
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	3	11	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	None
'91	00%	00%	00%	None
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	0	Dec:	-
	'91	0		-
	'97	0		-